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ABSTRACT

This life science activity module was designed to facilitate student conceptualization of plant growth. It is intended for use primarily in elementary grades but may be useful at higher grades. It provides students with hands-on experience and observational skill development. The package provides: (1) a teacher background sheet; (2) an activity cover sheet; (3) an activity sheet intended for use by teachers; and (4) a question and answer sheet for use in the upper grades. The activity cover sheet and the activity sheet have been designed like a lesson plan. (CW)

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HOW BEANS GROW

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INTRODUCTION

How Beans Grow is an activity useful to facilitate student conceptualization with a number of science behavioral objectives. It is intended for use primarily in the elementary grades but may also be useful in higher grades. Its use provides students not only a hands-on experience but also helps them with observational skill development. The package provides a teacher background sheet, an activity cover sheet, an activity sheet intended for use by teachers, a and question and answer sheet for use in the upper grades. The activity cover sheet and the activity sheet itself have been designed much like a lesson plan. This approach reduces greatly the amount of time teachers must spend preparing to conduct such activities since all necessary information is provided in one place and in logical sequence. The activity is presently being used by some elementary teachers in DoD Schools (DoDDS), Pacific Region.

HOW BEANS GROW

TEACHER BACKGROUND

The question of what happens to the roots and shoots of plants once the seeds have germinated produces all sorts of answers from students. Will the roots always grow down toward the earth regardless of the position of the seed when it is planted? Will the stem always grow up? The ways in which seeds grow are inborn or innate characteristics. The idea of inborn charactesistics may be contrasted with adaptations to the environment. One example of such an adaptation is the way plant leaves spread, always as widely as possible, so they can get as much sunlight and air as is possible.

This activity is designed so that students can investigate the effects of some of these innate characteristics, while at the same time, moving toward conceptualization in a number of areas as manifested by the objectives included on the "Activity Cover Sheet." The bothersome variable, that of soil effect has been eliminated with the activity. In addition, since the seeds are not covered, observations can be made on a regular basis, allowing students to draw conclusions based upon direct evidence.

DOC. NO. 00224
HOW BEANS GROW

ACTIVITY COVER SHEET

WEEK/ACTIVITY NUMBER/TITLE: / /How Beans Grow

GRADE LEVEL/S: K-12

PRESENTATION TIME: First session approximately 20 minutes, then several days.

PRESENTATION METHODS: Student Activity/Discussion

DoDDS "INSTRUCTIONAL" SCIENCE OBJECTIVES: This activity helps facilitate conceptualization with the following objectives:

1.1.1/K-4 OBSERVE and REPORT about an object or event using more than one sense.

1.1.2/K-4 OBSERVE objects and events by counting, comparing, estimating, or measuring in metric units.

2.1.1/k-4 DISTINGUISH living from nonliving things.

2.1.4/2-5 IDENTIFY the major structural and functional characteristics of plants and animals.

2.1.5/3-6 DESCRIBE adaptions of plants an animals.

2.3.3/1-6 IDENTIFY environmental conditions appropiate and inappropiate for plants and animals.

4.3.1/K-12 EXPRESS curiosity.

4.3.3/K-12 DEMONSTRATE respect for living things.

REFERENCES:

MATERIALS REQUIRED:
1. One small (baby food size) jar for each student.

2. Two bean seeds for each student.

3. One blotting paper for each jar - heighth = jar heighth and length = jar circumfrence.

4. A pan in which all bean seeds may be placed in a manner such that they sit on the bottom and may be covered with water.

5. A quantity of water.

6. One or more pair of sissors.

7. A quantity of masking tape.

8. One copy of How Beans Grow Question and Answer Sheet" for each grade 5-12 student.

SAFETY PRECAUTIONS:
1. None.

PREPARATION DATE:
1. 88MAR12

REVISION DATES:

TEACHER NOTES	ACTIVITY NOTES

I. INTRODUCTION

A. TITLE: How Beans Grow

B. OBJECTIVES:

1. OBSERVE and REPORT about an object or event using more than one sense.

2. OBSERVE objects and events by counting, comparing, estimating, or measuring in metric units.

3. DISTINGUISH living from nonliving things.

4. IDENTIFY the major structural and functional characteristics of plants and animals.

5. DESCRIBE adaptions of plants an animals.

6. IDENTIFY environmental conditions appropiate and inappropiate for plants and animals.

7. EXPRESS curiosity.

8. DEMONSTRATE respect for living things.

TEACHER NOTES

ACTIVITY NOTES

C. VALUE OF THE ACTIVITY: The way in which roots and shoots act act after sprouting in an important part of botany. Watching such activity helps students develop observational skills as well the abitity to predict. Younger students simply watch the seeds sprout. Older students may take notes no a basis, make tables and develop predictions.

II. PRESENTATION

A. ACTIVITY DESCRIPTION:

B. PROCEDURES:

1. Give each two beans.

2. Have each place their beans in the large pan.

3. Just cover the beans with water.

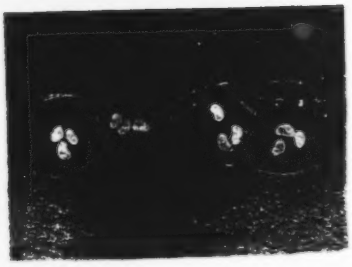
4. Soak the bean seeds over-night.

5. Give each student a jar.

6. Give each student a piece of blotter paper (blotter paper should be the length of the circumference of the jar and its heighth the approximate heighth of the jar.

7. Place the blotter paper in the jar so that it is against the inside of the jar.

TEACHER NOTES



ACTIVITY NOTES

8. Place two beans in each jar between the blotting paper and the glass.

9. Place a small piece of masking tape on the bottom of the jar and have each write his or her name on the tape.

10. Wet the blotting paper.

11. Divide the class into groups of four students each.

12. Have each group place jars together in a manner such that all jars are in different positions.

13. Insure that the blotter paper is wet every day.

14. Observe the jars every day.

    a. Watch how the stems grow.

    b. Watch how the roots grow.

15. Take notes and so on (upper grades).

16. Complete the question and answer sheets (upper grades).

17. Make Figures and Tables (upper grades).

TEACHER NOTES	ACTIVITY NOTES
	18. Class discussion of those events observed during the activity.
	III. **SUMMARY:** Briefly review the main points covered during the discussion.

HOW BEANS GROW

QUESTION AND ANSWER SHEET

DIRECTIONS: Answer each question to the best of your ability, based upon your observations over the last several days.

Question/Statement — Answer

1. How do your beans look?

   a. All have stems and roots.

   b. Some have only roots.

   c. Some have only Stems.

2. Which way do all roots appear to move as they grow?

   a. Down.

   b. Up.

   c. Sideways.

   d. Can't tell.

3. Which way do all roots appear to move as they grow?

   a. Down.

   b. Up.

   c. Sideways.

   d. Can't tell.

4. How can you make the stems from the seeds grow down?

5. How can you make the roots of the seeds grow up?

6. Try to think of ways to make a plant change the direction it grows. Test your ideas using additional bean seeds. Your teacher may ask you to report to the class regarding the results of this investigation. Be prepared!